REMARKS

Applicants have now had an opportunity to carefully consider the Examiner's comments set forth in the Final Office Action of April 1, 2009. Applicants file herewith a petition for RCE and a three month extension of time for filing a response to the final office action. Claims 1, 3-6, 8-28 and 46-48 are pending in the application. Claims 1, 3-6, 8-28 and 46-48 stand finally rejected. Claim 1 has been amended herein. Support for this amendment is found at Specification, page 9, the last full paragraph.

The Office Action

All claims stand finally rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Takehashi et al. (U.S. Patent No. 5,142,192) and Yano et al. (U.S. Patent No. 6,699,596).

Remaining Claims Are Distinguished From the Cited Art

Having reviewed the Examiner's position, and the art, Applicants wish to point out the disparity and patentable distinction between the teachings of the cited references, whether taken alone or in combination, and the invention as currently claimed. Applicant's have amended independent claims 1, 17 and 46 to more specifically define the phosphor laminate which is the subject of the claimed invention. Applicants maintain their position, as set forth in their last response dated December 31, 2008 and as summarized herein, that the references fail to realize and teach the invention which is the subject hereof.

Independent claims 1 and 46, and therefore all claims depending therefrom, recite a structure having a fluoride-containing layer positioned on the upper and/or lower surfaces of the blue emitting phosphor layer, this structure resulting in the fluoride layer and the phosphor layer forming a phosphor laminate having fluoride infused into the phosphor layer. Further, independent claim 17 and all claims depending therefrom recite the claimed phosphor laminate disposed on a glass substrate. By amendments presented herein, claim 1 further recites that the fluoride containing layer is directly adjacent and in contact with the phosphor thin film such that fluoride is partially infused into the phosphor layer but without any adverse effect on the luminosity of the phosphor. The primary reference fails completely to teach a blue light emitting phosphor layer comprising the claimed rare earth metal activated barium thioaluminate

or rare earth activated magnesium thioaluminate. Rather, it teaches a thin film device of a ZnSiMn phosphor, a material having different properties than the claimed blue light emitting phosphor. Takahashi includes the use of fluoride compounds as only one option in an extensive laundry list of possible insulating layer materials, but provides no teaching as to how to choose among those suggested. Further, the reference does not teach annealing or the use of annealing temperatures to control the effect of the insulating layer on luminosity. Without a teaching (1) regarding annealing, (2) to use a blue light emitting phosphor, and (3) to use a fluoride-containing insulating layer material, one cannot just assume that the fluoride will infuse the phosphor to form a laminate, and that no adverse effect on luminosity will be experienced. The reference fails completely to disclose any part of the claimed invention. The secondary reference, while it discloses a barium thioaluminate-base matrix material doped with europium, fails to include even one fluoride compound in the list of potentially usable thick- and thin-film insulating materials (see col. 7, lines 11-16 and lines 32-38).

It is further submitted that the prior art references fail to realize the benefit to be gained by using the claimed laminate structure, which critically includes a fluoride-containing layer adjacent the top and/or bottom surfaces of the phosphor layer employed. For proof of this, applicants respectfully request that the examiner take note of the Figures and attendant text in the subject specification, which set forth not only the unexpected performance of a device including the claimed laminate having a fluoride layer, but also the lesser performance of prior art devices that fail to include a fluoride layer in keeping with the invention.

Applicants rely on their prior arguments with regard to the cited references. Further, applicants would point out that a fair reading of the references would not lead one to combine them in an effort to achieve the claimed structure. First, neither reference seeks to enhance performance by using a structure that can be annealed at a lower temperature and yet maintain or better the luminosity of the device. However, giving the combination all possible weight, it would at best lead one to form a phosphor component including barium thioaluminate and an insulating layer chosen from those set forth at column 7 of the Yano reference, which does not include any fluoride-containing materials, as these are the insulating layers of choice for this phosphor thin

film. Takahashi provide a long list of potential insulating materials, however, they fail to provide any teaching as to how to select from among those listed. They exemplify, as their preferred embodiments, the use of AlN and SiO_2. Yano also provides a listing, but this listing fails to even include fluoride compounds, and Yano's insulating layer of choice is Ta_2O_5, which is also disclosed by Takahashi. Finally, the listing of insulating layers found at column 6, lines 49-52 of the primary reference does not even include any fluoride compounds. The foregoing, when combined, does not provide a fair teaching to use *only* a fluoride-containing layer(s) adjacent the phosphor layer, which is a critical limitation in each independent claim of the subject application.

It is further noted that, as claimed, the inclusion of the fluoride-containing layer(s) in direct contact with the phosphor has an unexpected and advantage effect on the resulting laminate, both in terms of allowing the laminate to be deposited on a glass substrate, which allows for annealing temperatures well below those necessary for other such laminates thus enhancing production capabilities, as well as in the performance of the resulting phosphor laminate, which as compared to other non-fluorine containing phosphor laminates has enhanced performance. See figures and text of the subject application.

More specifically, the invention provides a phosphor structure comprising a laminate of a rare earth metal activated barium thioaluminate or rare earth metal activated magnesium barium thioaluminate having a fluoride layer directly adjacent a top and/or bottom of the phosphor layer (see Figure 1, reference numbers 20/22), where some of the fluoride layer is infused into the phosphor layer such that annealing of the phosphor laminate can take place at lower temperatures with no decrease in luminance. The fluoride as infused therein acts to reduce the annealing temperature required to realize adequate phosphor luminance.

CONCLUSION

It is seen above that each reference alone fails to teach the claimed phosphor. Further, any combination of the cited references continues to fall short of teaching the claimed invention. Because neither reference includes a teaching or suggestion to the specific use of a fluoride-containing layer on the top and/or bottom of a blue light emitting phosphor layer, the combination cannot fairly be said to teach the claimed

invention. Neither reference provides a guide as to how to select fluoride as the infusing material, nor that it must be placed directly adjacent the top and/or bottom surface(s) of the phosphor layer. Because the references each fail to appreciate the advantage to be gained by such a structure, neither reference alone, nor the references taken together, even in the best light, teach the capability to anneal at lower temperatures, and the performance advantages gained by allowing the fluoride to infuse the phosphor layer at this annealing temperature. Absent the use of the subject application as a blue print for achieving the invention claimed, one skilled in the art would not look to these references for assistance, and even with this reference combination that teaching remains absent.